Industrial Subjects

IN A

Part-Time or Continuation School

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INDUSTRIAL SUBJECTS

IN A

PART-TIME OR CONTINUATION SCHOOL

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Published By
C. F. Williams & Son, Inc.
Albany, N. Y.

In presenting this monograph the authors wish to give due credit for valuable suggestions and criticisms to,—

Bruce Publishing Company, Milwaukee, Wis.
Claude L. Kulp, Director of Industrial Arts, Ithaca, N. Y.
Federal Board for Vocational Education, Washington, D. C.
Miss Mary Muldoon, Director of Part-Time School, Waverly, N. Y.

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THE ORGANIZATION AND TEACHING OF INDUSTRIAL SUBJECTS IN A PART-TIME OR CONTINUATION SCHOOL

1. The Problem

Part-time education is confronted with the immediate problem of demonstrating that it is a service program of training of direct worth and value to the individual and to the community. Demonstrating the worth of a movement is not accomplished by mere propaganda but it is the resultant of community understanding and appreciation and real accomplishment. The program of part-time education must provide for a movement in well defined directions. The material in this monograph is presented from the standpoint of definite educational possibilities for the various age groups returning to the part-time schools. It has to do with organization of a plan of work that aims to produce results in terms of recognized individual betterment. It furthermore represents experiences developing from the inauguration of the part-time education movement in the State of New York.

The development of the entire subject is based on certain fundamental theses:

1. The children returning to part-time schools are wage earners in the vast majority of instances and are therefore more interested in instruction of an occupational character than in instruction of an academic nature.
2. That the period between 14 and 16 years in the young wage earner's life is one requiring guidance, counseling and experience that will function in an intelligent selection of an occupation.
3. Vocational experiences offered in specific occupations or groups of occupations within the part-time schools afford a most effective opportunity for vocational guidance.
4. Vocational activities well organized and taught in part-time classes will equip the pupils with a certain amount of skill in basic jobs and give an understanding of fundamental related technical facts.
5. Notwithstanding time limitations valuable instruction in fundamental jobs may be offered to students that is distinctly trade preparatory in character; profitable work may also be given in related technical subjects that is manifestly trade extension in nature.

II. The Significance of Occupational Facts for the Part-Time School Director and Teacher

It is most trite to say that teachers and directors in the field of part-time education should know their communities. The amazing truth is, nevertheless, that many of them do not know what is happening outside the walls of the school buildings. The occupational distribution of juveniles and adults in the community, and the character of the different occupations and their desirability from the standpoint of adult or juvenile employment, is information of prime importance with which the people in part-time education should be always familiar.

The occupational facts are available and it requires very little effort to or-

ganize them for use. The new United States Census is now available. Chambers of Commerce usually have a certain amount of information and in states where an industrial commission or labor department is maintained much valuable information is obtainable. The records of the part-time pupils afford a wealth of occupational information about juvenile employment. The information on the personal records should be supplemented by the reports of those charged with the follow-up work. Every visit made to a place of employment should result, not only in securing the facts about an individual's work, but as much more information about the jobs in the entire plant as may be practical. A cumulative record of occupational information should be built up as early as possible. Key notes of a successful part-time program are: (1) secure the occupational facts in your community; (2) use the occupational facts intelligently.

An illustration of the value of this information is found in the brief study of the occupational distribution in the cities of Albany and Schenectady. Employment conditions have not materially changed in these two places during the past ten years so that the 1910 census gave very usable information on the adult employments. Table I indicates very specifically the general distribution.

TABLE I. GENERAL OCCUPATIONS OF TWO TYPE CITIES

Occupations	Albany		Schenectady	
	Male	Female	Male	Female
All occupations	33344	12780	26438	5873
Agriculture, forestry, etc.	332	9	126	7
Manufacturing and mechanical	13059	4011	17020	2005
Transportation	5248	200	1630	82
Trade	5947	1132	2622	432
Public service	921	27	338	3
Professional service	1781	1261	12r4	529
Domestic and personal service	2622	4381	1240	1699
Clerical	3419	1759	2133	1116

Table II which follows indicates the major skilled and semi-skilled occupations in the field of the mechanical and manufacturing pursuits.

The information disclosed by Table II should cause a supervisor or director to at least hesitate about equipping general woodworking shops for the part-time students.

TABLE II. MAJOR SKILLED TRADES

TRADES	Albany			Schenectady		
	Male	Female	Total	Male	Female	Total
Bakers	293	29	322	101	7	108
Blacksmiths and forgers	262	0	262	333	0	333
Boiler makers	239	0	239	359	0	359
Brick and stone masons	352	0	352	205	0	205
Builders and building contractors	293	5	298	251	1	252
Carpenters	1209	0	1209	705	0	705
Compositors, linotypers, typesetters	458	18	476	124	19	143
Dressmakers and seamstresses	0	1163	1163	1	396	397
Engineers (stationary)	312	0	312	239	0	239
Machinists, toolmakers, millwrights	1004	0	1004	3934	0	3934
Molders, founders and casters	362	1	363	564	0	564
Milliners and millinery dealers	17	318	335	9	132	135
Painters, varnishers, etc	676	1	677	420	9	429
Pattern and model makers	31	4	35	242	1	243
Plumbers and gas and steam fitters	545	0	545	255	0	255
Sewers and sewing machine operators	29	708	737	2	111	113
Tailors and tailoresses	428	105	533	139	14	153
Tinsmiths and coppersmiths	99	1	100	102	0	102

Table III represents a study made of the 14 and 15 year old employed children attending part-time school in the two cities.

TABLE III. OCCUPATIONS FOLLOWED BY 14 AND 15 YEAR OLD CHILDREN

Occupations	Albany		Schenectady	
	Number	Percent	Number	Percent
Sales clerks	13	5.0	29	6.0
Bundle wrappers	9	4.0	4	.5
Shipping clerks	6	2.5	8	2.0
Delivery boys	23	9.0	8	2.0
Messengers—office clerks	88	28.0	200	43.0
Stenographers	2	1.0	3	.5
Newsboys	5	2.0	0	0
Bell boys	3	1.0	6	1.0
Telephone operators	1	.5	1	0
Domestic workers	17	7.0	53	11.0
Factory workers	112	40.0	70	15.0
Unclassified	0	0	86	19.0
Totals	279	100.0	468	100.0

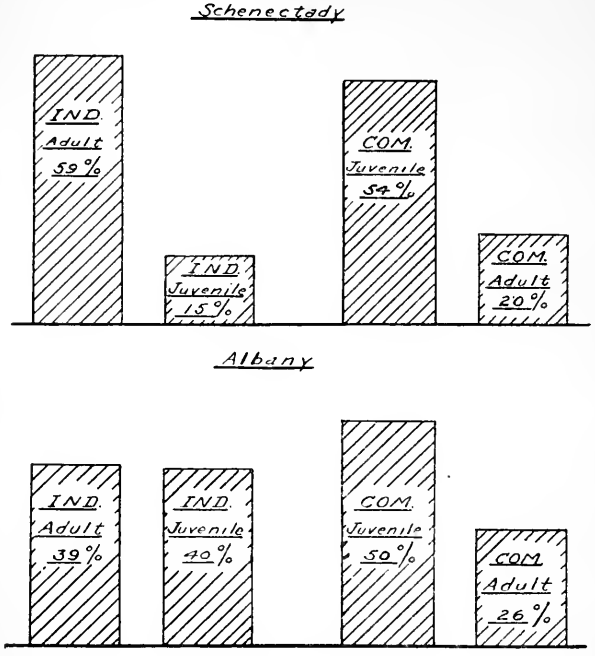
Table III indicates very positively that children under 16 years of age are not in factories but are in juvenile occupations that present meager possibilities for promotion.

Chart I which follows shows graphically the adult and juvenile occupations and indicates an almost complete reversal on the part of the juveniles sometime after the sixteenth birthday. These facts should be very signifi-

cant to any school administrator and result in an organization that will aid these young wage earners to make an intelligent transition.

CHART I

Industrial and Commercial Occupations in Two Type Cities



The conclusions based on the foregoing chart and tables are: (1) juvenile employment is predominately in the commercial occupations; (2) adult employment is largely in the manufacturing and mechanical occupations; (3) the juvenile and adult distribution indicates a complete change of occupation on the part of many juveniles sometime after the sixteenth birthday; (4) the fact that many changes are made would seem to show that vocational guidance has a definite place in the part-time education program for the 14 and 15 year groups: (5) the major adult occupational groups are disclosed and should have a bearing on the organization of courses of instruction.

The illustration of the two type cities should indicate the value of occupational facts. A program of public education will never be permanently established unless based on the facts pertaining to the community. The use of hypotheses should be eliminated from the practises of a part-time school administrator. His doctrine should be (1) get the occupational facts of the community; (2) use the facts intelligently for educational purposes.

III. The Industrial Survey and the Job Analysis

Before instructional material of a satisfactory kind related to the indus-

tries of the community can be organized it is essential that the industries be surveyed. The procedure followed in the making of a survey is simple. The survey worker should first visit the administrative officers of the plants which it is desired to survey and obtain permission to make studies of the pay roll jobs in the plants. The purpose of the survey and the work of the part-time school should be explained to these individuals and their interest and cooperation secured.

It is desirable with the help of the executive heads to make an organization and promotion chart for a typical industrial establishment of the type which is being surveyed. Such a chart should show the usual places of entrance and the regular lines of promotion for the principal divisions of the industry. The following diagram illustrates the idea mentioned.

PROMOTION DIAGRAM

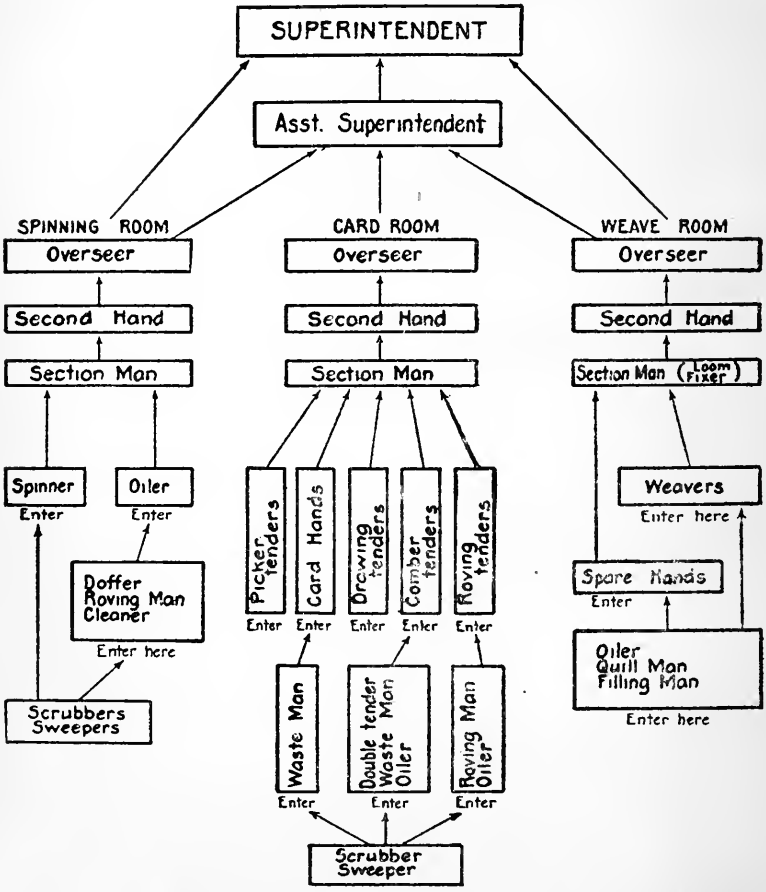


Diagram showing the usual places of entrance and the regular lines of promotion in the three main divisions of the mill. Transfer from one department to another is unusual, and the promotions are consequently within the same rooms.

Next the names of the subordinate executives in the plants should be secured and these individuals should be interviewed and all of the general information regarding the industry which is needed should be obtained.

Finally, each pay roll job should be studied. Exactly what the worker does should be noted, exactly what they need to know to do the job determined, and the working conditions as to safety, sanitation, etc., recorded.

A simple set of cards which can be used to record the results of the job studies have been devised and are here given.

Card No. 1

Job No.....

GENERAL INFORMATION CONCERNING JOB OF.....

1. Job Specifications (Requirements)
   a. Education (Grade Completed).....
   b. Physical Requirements.....
2. Community Importance (Estimated) A, B, C, D, E, F *
3. Employment, Steady or Seasonal (Check One) Wage $.. Hrs...
   per week *per week*
4. Working Conditions:
   a. Hygiene, A, B, C, D, E *
   b. Moral, A, B, C, D, E *
   c. Occupational Dangers.....
   .....
   d. Welfare Work Carried on by Employer.....
   .....
5. Expectation:
   a. Job, Permanent.....
   b. Job, Temporary.....
   c. Promotional Possibilities.....
6. Labor Legislation particularly applicable to Job, as: prohibitive employment, hours of labor, operation of machines, physical examination, etc. (See bulletin, New York State Labor Law, 1920).....
   .....

*Remarks; A—90-100; B—80-90; C—70-80; D—60-70, etc.; Check *one*.

(A–1)

Card number one lists the points for the job inventory giving pay, promotional possibilities, working conditions and legal limitations affecting the job.

CARD NO. 2

Card number two lists the points for job analysis. On it are indicated (1) operations and (2) steps in the operations, and a checking of the human and mechanical phases of the work.

JOB NO. .....

JOB ANALYSIS—Name of Job .....

OPERATION	STEPS IN EACH OPERATION, *IN ORDER OF LEARNING*	H	M

(A-2)

NOTE:—H=Human Operations, M=Machine Operations

CARD NO. 3

Card number three lists the auxiliary information which a worker must have if he is to perform the job.

JOB NO.....

AUXILIARY INFORMATION FOR JOB OF .....

TRADE TERMS	MATERIALS		TOOLS	HYGIENE—SAFETY
	NAME—PROPERTIES	SELECTION—USE		
MACHINE				
OPERATION				
LOCATION				
SPECIAL				

(B-1)

CARD NO. 4

Card number four lists what technical information the worker must have to perform the job; that is, the mathematics, science, drawing and other technical information which he must possess.

JOB NO.....

TECHNICAL INFORMATION NECESSARY FOR PERFORMING JOB OF.....

TEACHING POINTS

MATHEMATICS	SCIENCE	DRAWING	*ANY OTHER* INFORMATION
			More especially *Vocational Guidance* facts and references.

CARD NO 5

Card number five lists possible correlations which tie up with experiences on the job. Here can be recorded the general information which a worker might well have relative to the job, which would give him a broader outlook on his work and world.

JOB NO. .....

POSSIBLE CLASSROOM CORRELATION FOR JOB OF .....

RELATED MATH.	RELATED ENGLISH	RELATED HYGIENE	REL. DRAWING	REQUIRED SUBJECTS
		ACCIDENT *PREVENTION*		U. S. HISTORY, ECONOMICS, INDUSTRIAL HISTORY AND CIVICS.

IV. The Objectives of Industrial Subjects in the Part-time School.

A previous section endeavored to establish the importance and need of vocational activities within the part-time school. What are some of the definite things that should result from the inclusion of this work as a specific part of the part-time school? The brief statistical study very clearly called attention to the fact that the 14 and 15 year old children were not in permanent employments. It therefore follows that the major objective of the industrial subjects for those age groups may well be vocational guidance. The shops may be considered as industrial laboratories equipped with such tools, machines and material as will enable the prospective adult wage-earner to gain a very practical, common sense insight into the work of the specific occupation or group of occupations.

It also provides a form of educational activity for the young wage-earner that interests him because of its similarity to the activities with which he is surrounded in his daily work and the appeal which it makes to his native reactions. The shop, with its work as the source, will also provide for a great amount of instruction in mathematics, science, hygiene and safety, English, civics, history and industrial economics. In the shops organized for guidance purposes, the younger pupils will secure a certain amount of practical experience in the use of tools and materials on fundamental jobs in a number of occupations. The trade preparatory group will undergo certain practical experiences in a specific trade while the trade extension group will profit by technical training related to their trade.

The objectives of the industrial subjects in the part-time school may then be thus summarized:

1. To provide a practical form of vocational guidance in specific occupations or groups of occupations.
2. To provide a virile form of educational activity that will appeal to and immediately serve the young wage-earners.
3. To utilize the industrial activities to vitalize the mathematics, science, hygiene and safety, English, civics, history and industrial economics.
4. To provide for the 14 and 15 year old groups a limited amount of practical experience in the use of tools and materials on fundamental jobs in several occupations.
5. To provide for pupils who are preparing for specific occupations a certain amount of practical experience in that specific field; for the pupils who are wage-earners, in their chosen field, related technical experiences that will supplement their training on the job.

V. General Organization of the Industrial Subjects for the Accomplishment of the Vocational Guidance Objective

The objectives have been set up and the next step is the organization of the program of work to bring about the desired results. The present organization of manual training or the industrial arts will not secure these results in the terms of the vocational guidance objective. An opportunity was offered in New York to verify this statement. Approximately 75 of the smaller cities made use of the existing high school departments and attempted through the regular teacher of that department to give the usual content of the courses in those subjects. It resulted in the part-time pupils receiving a small amount of practical work in general woodwork. It may have functioned in the field of general education, but it contributed

very meagerly toward any vocational guidance. Nondescript woodwork has no place in the part-time school.

It has been stated earlier in this discussion that vocational guidance may be most effectively given by means of practical experiences in the various occupations. The manual training or industrial arts shop equipped for general woodwork was not successful in accomplishing the purpose. To secure the results that are expected of the part-time schools, the industrial activities should be organized around groups of trades. The following grouping is suggestive of the classification of the major skilled trades. Many other groupings in the field of textiles, clay and pottery, glass, and foods are possible.

Building Trades
- Carpentry.
- Cabinet work and interior finishing.
- House wiring.
- Painting and decorating.
- Plumbing.
- Bricklaying and masonry.

Metal Trades
- Machine shop.
- Sheet metal work.
- Welding.
- Toolmaking.
- Forging and drop hammer work.

Electrical Trades
- Motor operation and repair.
- Power plant operations.
- Telephone work.
- Electrical street railway.
- Lighting work.
- Wireless work.

Automobile Trades
- Motor work.
- Chassis and transmission work.
- Starting and lighting.
- Tire work.

Printing Trades
- Composition.
- Presswork.
- Photo-engraving.
- Electrotyping.
- Book binding.

Drafting Trades
- Machine.
- Architectural.
- Structural.
- Topographical.

Every course that is organized must give consideration to three factors: (1) the practical jobs; (2) the related technical work; (3) the related auxiliary information.

The practical jobs should in all cases be selected from the standpoint of contributing an accurate experience in the work of the trade or occupation. Failure to secure this type of experience defeats one of the major purposes of the instruction.

The related technical work which includes the science, drawing and mathematics should develop from the practical work being carried on in the shops.

The related auxiliary information should also develop from the shop activities and be a definite part of a unified course. It should consist of safety and hygiene, trade terms, materials and equipment, and the vocational guidance facts. The last phase of the related auxiliary information is the one that has been least understood and appreciated. The following outline of topics is therefore presented for the vocational guidance material.

Function of the Occupation.

Relation of the specific occupation to the other trades in the trade group.

Importance of the Occupation.

Numerical place the occupation fills, locally and nationally.
Value of product turned out locally and nationally.
Comparisons with other occupations—use graphs.

Conditions of Employment.

Mental and physical strains involved in the daily routine of work.
Specialization and its effect on the worker.
Dangers involved that must be taken account of: tools, machines, appliances, riggings, scaffolding, etc.
Legislation pertaining to safeguards.

Hygiene of the Occupation.

Ventilation and its relation to the health of the worker.
Fumes, dusts, acids, poisons and their effect on the health of the worker.

Economic Conditions.

Hours and wages of the occupation.
Average number of working days and income per year.
Average period of earning ability.
Comparison with other occupations.
Profit sharing, insurance and pension provisions.
Legislation pertaining to hours and wages.
Evolution of labor and industry.

Entrance to the Occupation.

Age at which the occupation is usually entered.
Various ways of entering.
Apprenticeship and conditions the learner encounters.
Legislation pertaining to apprenticeship.

Demand for Labor.

Relation between supply and demand.
Factors influencing the labor market.
Ratio between the number of workers in the specified occupation and other related trades.

Mental and Physical Requisites for Efficiency in the Occupation.

Character of education, training and experience needed for success.
Personality, attitudes and aptitudes requisite for success.
Importance of good health, hearing, eye sight, and mental and physical alertness.

Opportunities for Advancement.

Lines of promotion within the trade or industry and the rewards and responsibilities accompanying them.
Trade and technical requirements for advancement.
Personality, attitudes and aptitudes contributing to promotion.

VI Plant and Equipment for Teaching the Industrial Subjects in a Part-time School

The Composite One Room Shop for the Small Community.

The needs of the working boy, 14 and 15 years of age, may be served best in the small community by offering industrial activities other than the formal high school bench woodwork. This should give way to shop activities in the building trades and possibly the metal trades. Local industrial conditions will in all cases determine the final selection of the trade groups for instructional purposes. In a community where the metal industries predominate the metal trades would naturally be given—the idea being to train workers for the prevailing local needs.

To illustrate the one room composite organization more in detail, it will be assumed that a small community desires to develop the program around the building trades group and the metal trades group. It will be possible to offer practical work and instruction in the following trades providing equipment is available.

Building Trades Group

Practical work offered in
- Carpentry.
- Inside finishing and cabinetmaking.
- Inside wiring.
- Painting and decorating.

Metal Trades Group

Practical work offered in
- Machine shop.
- Sheetmetal work.

The above organization indicates that practical activities cannot be carried on within the school for all the trades of each group. Chart Number II which follows is to show that the related technical and auxiliary information may be made an integral part of the instruction for the trade group.

Chart II. General Organization of Instruction for the One Room Composite Shop.

Trade Group	Practical Jobs in	Related mathematics, science, drawing, safety, hygiene, trade terms, equipment and materials	Vocational Guidance in
Building Trades	Carpentry Inside finishing Inside wiring Painting and decorating	Carpentry Inside finishing Inside wiring Painting and decorating Plumbing Masonry	Carpentry Inside finishing Inside wiring Painting and decorating Plumbing Masonry Building contractor Architect
Metal Trades	Machine shop Sheetmetal	Machine shop Sheetmetal Toolmaking Forging Welding	Machine shop Sheetmetal Toolmaking Forging Welding Machine drafting and designing

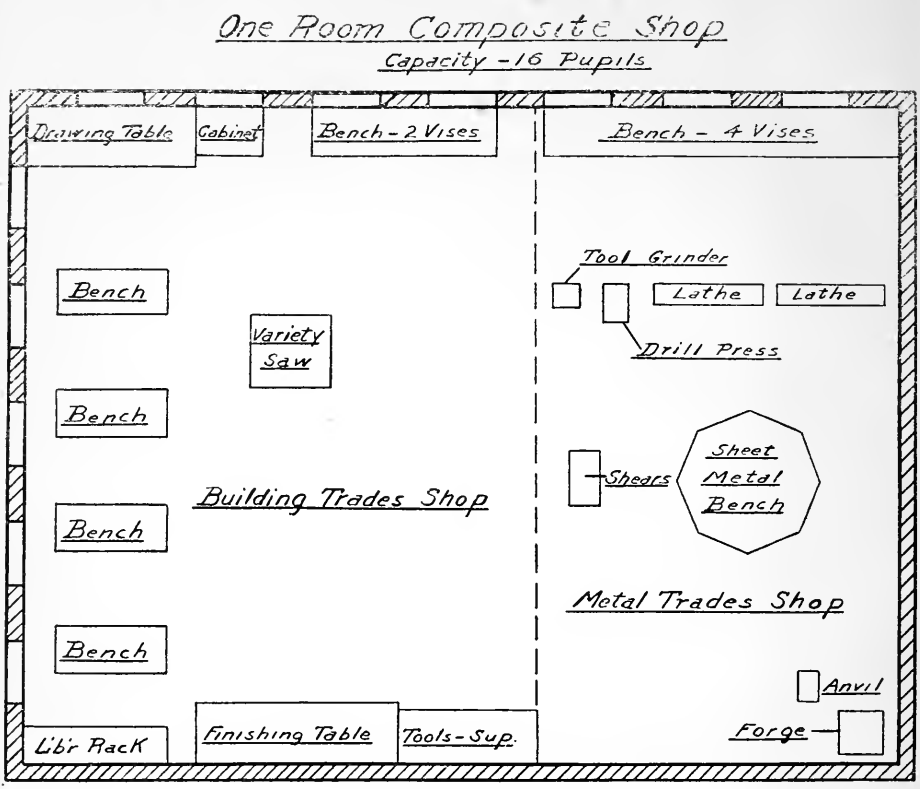
Chart II indicates that practical shopwork in some form is carried on in six trades. Instruction of a technical nature is drawn from eleven different occupations while vocational guidance information is presented from fourteen distinct occupations. If the trade groups are thoroughly representative of the occupational activities of the community this instruction should be most beneficial.

This program is possible only in a shop especially planned for a variety of activities. The shop layout which accompanies this section is suggestive of the type of shop necessary to offer instruction on a trade group basis. In the main, the layout is self explanatory. The entire thought of this plan was to provide space and equipment that would at least approximate in a small way actual conditions in a good production plant. Critics have said that composite shops are not found in the industrial world which is quite true, but it must be recognized that the composite organization is an effort to set up in miniature a small section of a production plant, each one in itself accurate as far as possible in regard to equipment, materials, constructions and conditions of the occupations.

A study of the shop layout reveals that it has lost its formal classroom appearance. Benches and equipment are placed as they are found outside of the school. Space is also available for the construction and assembly of work which is so essential when the products are other than taborets, plant stands and piano benches.

Equipment for the Composite One Room Shop

The equipment for this type of shop is not extensive. In fact, most manual training or industrial arts shops are provided with much of it. In practically all cases, a complete re-arrangement will be necessary. The lists here presented should be considered as comprising the minimum of equipment.



PLAN FOR COMPOSITE ONE-ROOM SHOP IN CONTINUATION SCHOOL.

Building Trades
Carpentry, Inside Finishing, Cabinetwork, and Painting.

1 Variety saw, motor, belting and guard.
x 4 Single benches with vises.
x 1 Long double bench with vises.
x 1 Long drawing table.
x 1 Cabinet for drawings.
x 1 Cabinet for tools and supplies.
x 1 Lumber rack.
8 Folding chairs.
x16 Individual drawing boards.
Individual tools for 6 benches.
General tools.
Portable blackboard.
Glue pot.
Clamps.
Paint and varnish brushes.
Scrapers.
Supplies: lumber, screws, nails, glue, sandpaper, paints, oils, stains, varnishes, colors, turpentine, etc.

x May be made in the shop.

Inside Wiring.

Small tools: hammers, screw drivers, pliers, hack saws, braces and bits, files, knives, etc.

General equipment and supplies: testing instruments, knobs, cleats, switches, bells, lamp sockets, globes, push buttons, batteries, bell wire, light wire, annunciators, tubing, conduit material, screws, nails, staples, etc.

Metal Trades

Machine Shop Work

2 12″ Engine lathes, motor, belting and shafting.
1 Single spindle upright drill.
1 Tool grinder.
1 Gas furnace or forge.
1 Anvil
x 1 Long bench.
4 Machinist's vises.
Hand tools.
1 Set forge tools.

Sheet Metal Work

1 Squaring shears.
1 Burring machine.
1 Wiring machine.
1 Beading machine.
1 Bow folder.
1 Pair forming rolls.
x 1 Heavy bench.
4 Double burner gas furnaces.
Small tools and equipment: hammers, punches, snips, dividers, squares, soldering coppers, pliers, stakes, mandrels, plates, etc.
Supplies: tin plate, galvanized iron, copper zinc, common black iron, wire, rivets, solder.
Note—All machines should be equipped with approved guards.
x May be made in the shop.

It is estimated that the shop may be equipped for the dual purpose at approximately the following cost:

Building Trades Shop (Making equipment specified)	$1,200.00
Metal Trades Shop	2,500.00
Total Cost	$3,700.00

The Teacher in the Composite One-Room Shop

This type of shop is essentially a one teacher shop. It will require a man of more than average ability and one with a wide general experience in industrial work. The industrial-teacher-training departments in the state normal schools are making efforts to provide this type of teacher. This particular course is two years in length with at least two full summers of approved practical work in industry.

A small number of skilled tradesmen are also being secured who measure up to the requirements. Teachers in service are attending summer schools in increasing numbers and are also being prepared to meet this new requirement of the part-time education program.

Industrial Work in a Two or More Shop School

The same objectives prevail in the larger school, as in the one-shop school. The difference is that added facilities are available for each trade group and usually each shop has a separate teacher. This is essentially a much more

desirable organization of the industrial activities. Local industrial conditions should again determine the types or combinations of trade work to be developed.

Time Allotted to Practical Work.

In schools equipped for two trade group activities, the students should be encouraged to spend enough time in each to make an intelligent occupational decision. As previously indicated this may vary considerably with individuals. Schools prepared to offer more than two lines of work should permit the students to elect the trade groups they desire to pursue during the prevocational period. The carrying out of this suggestion may present practical difficulties in the matter of distributing students through the different trade activities. This may be largely obviated by each student electing at least two groups.

Organizing the Industrial Subjects in a Two or More Shop School.

Each trade group has an independently equipped shop and a teacher. Chart No. III indicates the organization that is recommended for a larger school.

Suggestions for a Shop Layout.

A safe principle to follow in laying out a shop for a part-time school is to avoid the arrangement that presents the appearance of the formal classroom with its rows of benches, desks or tables. Endeavor to approach the well laid out modern commercial shop. Note that the layout of the one shop school presents a radical departure from the old manual training shop.

The minimum amount of floor space for sixteen students should be 1200 square feet.

Chart III. Unit Shop Organization for Larger Schools.

Two or More Shop Schools.

Building Trades Group (Unit Shop)	Metal Trades Group (Unit Shop)	Printing Trades Group (Unit Shop)
1. Trade activities in Carpentry Cabinetmaking Inside wiring Painting x Plumbing x Plastering	**1. Trade activities in** Machine shop Sheetmetal x Toolmaking x Forging x Welding	**1. Trade activities in** Composition Presswork x Bookbinding x Linotyping x Monotyping x Photo-engraving
2. Technical work Related drafting Related mathematics Related science	**2. Technical work** Related drafting Related mathematics Related science	**2. Technical work** Related art work Related mathematics Related science
3. Auxiliary Information Safety and hygiene Trade terms Equipment—materials Vocational guidance facts	**3. Auxiliary Information** Safety and hygiene Trade terms Equipment—materials Vocational guidance facts	**3. Auxiliary Information** Safety and hygiene Trade terms Equipment—materials Vocational guidance facts

x Practical work not given in these trades, only the vocational guidance facts and some of the technical and auxiliary information

Equipment for a Two or More Shop School.

The equipment for each trade group shop will be more extensive than that provided for the one room composite shop. Additional machine tools, benches, and individual equipment should be installed.

It is estimated that the building trades shop could be equipped for $3,000. The metal trades shop would require approximately $4,500 and the printing trades will need about $1,800. In all cases these are minimum estimates.

The Teacher in the Two or More Shop School.

A unit shop organized about a single trade group will not require so large a degree of versatility on the part of the teacher as does the one room composite shop. It will be easier to secure an instructor who is able to teach a group of trades in his own immediate field than one proficient in two distinct fields. In both cases better than average work will be needed on the part of the teacher.

Teacher training courses with the requirements for resident and practical work are rapidly moving forward to meet this new demand. Improvement and extension courses for teachers already in service are also in a measure aiding in the broader preparation of the teachers demanded in the many new part-time schools.

VII ORGANIZATION OF COURSES OF INSTRUCTION FOR A PART-TIME SCHOOL.

Fundamental Organization Factors.

It should be recognized that an analysis of the trade is absolutely fundamental to the building of a course of instruction. An analysis serves to inventory the trade, classify the contents, and thus make usable to the best advantage, the various trade essentials.

Selection of trade content for industrial purposes should be made on the following basis:

a. Objectives of the instruction or course
b. Age, previous training and education of student
c. Time devoted to the work
d. Equipment and material available

Suggested Form of Organization.

The charts which follow (Numbers IV to X) are suggested as a practical method of organizing teaching material. The greatest merit of this plan is that it serves to unify the contents of the trade subjects. The work listed under jobs is arranged according to difficulty. It is not the purpose to have all jobs listed but rather selected jobs from each group. In some instances, several will be working on the same job at the same time, for example, the garage. These courses are organized as short courses and primarily for vocational guidance purposes.

The attempt has been made by means of these suggestive outlines of courses to set up a simple and workable program. They admit of extension by individual teachers as their work may demand. It has been found that many of the elaborate courses that have been worked out, in innumerable instances are preserved and filed all too carefully, and are not in daily use on the floor of the shop.

An effort to picture each phase of the shop activity has also been made and to show the relationships existing between the practical jobs, the technical information and the auxiliary material. Courses laid out in this form offer no excuse for slighting certain aspects which go to make up the complete unit. Experience has shown that the auxiliary information and especially the vocational guidance aspect has been almost entirely disregarded in the actual instruction given from day to day by the average teacher.

Attention is again called to Charts Nos. II and III which show that practical work is offered in only part of the trades within each group. Certain phasesof the technical aspects are presented for all the trades which is also true for the vocational guidance information.

CHART IV. SUGGESTIONS FOR OUTLINING INDUSTRIAL COURSES.

Building Trades Group---Carpentry.

JOBS	RELATED TECHNICAL WORK		AUXILIARY INFORMATION			
	Drafting	Mathematics	Materials Equipment	Trade Terms	Hygiene Safety	Vocational Guidance
Window Boxes Sand Boxes Foot Rests Kit Boxes Dressing Room Benches	Freehand working drawings of the jobs Mechanical drawings of the jobs	Amount of material in the jobs Cost of jobs Value of products Use of the rule	Plane, rule, try-square, saws, hammer Pine lumber, nails	Working face Working edge Butt joint Chamfer Bevel	Care in planing, sawing, nailing Personal hygiene	Importance of occupation Hygiene of occupation Hours and wages Entrance to occupation Demands for labor Efficiency factors in occupation Opportunities for advancement
Saw Horses Scaffold Brackets Play Apparatus Window Screens Window Frames Step Ladders Work Bench			Chisels, mallets, brace, bits, guage Oak and bass wood lumber	Mortise Tenon Rabbet Grooving Dado Half lap	Use of chisel Clear passage ways Protruding nails Oily waste	
Frame Garage Small Tool or Play House	Mechanical drawings of the jobs	Estimating problems Rafter problems and the use of the steel square	Framing square Level Chalk line Redwood Cedar shingles Roofing material	Sills, plates Studding Hip and valley rafters Rise and run	Erecting scaffold Working on scaffold Care of injuries	

CHART V. SUGGESTIONS FOR OUTLINING INDUSTRIAL COURSES.

Building Trades Group---Inside Electrical Wiring.

JOBS	AUXILIARY INFORMATION		RELATED TECHNICAL WORK			
	Drafting	Mathematics	Equipment Materials	Trade Terms	Hygiene Safety	Vocational Guidance
Preliminary experience: Magnetism Primary cells Measurements of current Induction motors Dynamos	Study electrical symbols and make drawings Illustrate experiments	Simple problems involving: Attraction and repulsion of magnets Calculating voltage, amperage, resistance	Iron filings Magnets Dry and wet cells Galvonometer Materials for a small induction coil or motor	Use underwriter's code for all trade terms	Insulation for protection First aid for shocks and burns	Importance of occupation Hours and wages Hygiene of occupation
Bell Wiring Wiring for telephone and telegraph Wire Garage for Light Wire Small House Wire automobile	Sketch and draw all wiring diagrams for each installation	Cost of installation including materials and labor	Wire, cleats, knobs Bells Batteries Annunciators Hammer, pliers, screw driver Blow torch		Use of torch Working on ladders and scaffolds Personal hygiene Study N. Y. State Industrial Code	Entrance to occupation Demands for labor Efficiency factors in occupation Opportunities for advancement

CHART VI. SUGGESTIONS FOR OUTLINING INDUSTRIAL COURSES.

Building Trades Group---Painting and Decorating.

JOBS	RELATED TECHNICAL WORK		AUXILIARY INFORMATION			
	Science	Mathematics	Materials Equipment	Trade Terms	Hygiene Safety	Vocational Guidance
Painting Window boxes Screens Playground apparatus Wainscoting Doors and window sash	Composition of paint Effect of paint Action of paint in drying Mixing paints Color combinations	Estimating areas of surfaces Figuring covering capacity Cost of materials labor	Brushes Putty knives Scrapers Sand paper Scaffolds Ladders Rigging White lead, oil, turpentine, dryer	Scraping Sanding Burning off Puttying Primers Rigging Jacks	Use of ladder, scaffolds, rigging Cautions in sanding and using colors Personal cleanliness	Importance of occupation Hygiene of occupation Hours and wages Entrance to occupation Demands for labor Efficiency factors in occupation Opportunities for advancement
Inside Finishing Filling Staining Shellacing Varnishing and rubbing	Action of fillers Mixing stains Action of finishes on surfaces	Cost of materials, labor Estimating problems	Fillers Stains Colors Wax Pumice Shellac Varnish Oil Sand paper	Filling Rubbing Waxing Polishing Pigments	Care of oily waste Personal hygiene	
Decorating Preparation of walls Kalsomining Lining, striping, stencils	Composition of water paints Action of finishes on wall	Estimating problems	Sizing Coloring Kalsomines Stencils	Sizing Blending Striping Stenciling Ribbons Scrolls	Use of ladders, rigging	

CHART VII. SUGGESTIONS FOR OUTLINING INDUSTRIAL COURSES.

Building Trades Group---Cabinetmaking and Inside Finishing.

JOBS	RELATED TECHNICAL WORK		AUXILIARY INFORMATION			
	Drafting	Mathematics	Materials Equipment	Trade Terms	Hygiene Safety	Vocational Guidance
Drawing Boards First Aid Cabinets Book Shelves Drawers	Freehand working drawing of job Mechanical drawing of job	Use of the rule Amount of material in jobs Problems in estimating cost of jobs Value of product Problems comparing the cost and selling price	Plane, square, guage, saws, chisels Pine, basswood, chestnut, oak	Butt joints Dowelled joints Rabbeted joints Miter Grooving Dovetail	Care in planing, sawing, chiseling Care of injuries Fire precautions	Importance of occupation Hygiene of occupation Hours and wages Entrance to occupation Demands for labor Efficiency factors in occupation Opportunities for advancement
Typewriter Tables Drawing Tables			Brace, bits, dowels, miter box Oak, birch	Mortise Tenons Rails Three-ply stock	Use of machine tools Personal hygiene	
Tool Cabinet Laboratory Tables Book Cases Desks			Veneered stock	Panels Stiles		

CHART VIII. SUGGESTIONS FOR OUTLINING INDUSTRIAL COURSES.

Metal Trades Group---Machine Shop Work.

JOBS	RELATED TECHNICAL WORK		AUXILIARY INFORMATION			
	Drafting	Mathematics	Materials Equipment	Trade Terms	Hygiene Safety	Vocational Guidance
Parallel Clamps Cutting off stock Laying out Shaping Drilling Turning Thread cutting	Freehand working drawing of jobs Mechanical drawings of all jobs	Use of scale Problems involving use of calipers and dividers Speeds of pulleys Speed of work in lathe Cost of materials	Scales Calipers Dividers Files Square Vise Drills Taps and dies Drill-hand Drill press Shaper Steel	Lay-out Drilling Scribing Centering Chucking Shaping Calipering Prick punch Tapping Reaming	Fire prevention Personal hygiene Dangers of loose clothing Use of machine tools Use of guards Starting and stopping of machines Inattention to work Obstructed stairways and passages	Importance of occupation Hygiene of occupation Hours and wages Entrance to occupation Demands for labor Efficiency factors in occupation Opportunities for advancement
Drill press Vise Woodworking Vise Toolmaker's Jack Lathe Parts Grinder Parts Drill Press Parts		Micrometer problems Speeds of pulleys and gears Cost of materials Value of products Wage problems	Hammer Punch Center square Micrometer Lathe centers Chucks Face plates Lathe Thread guage Grinder Cast iron	Broaching Brazing Babbitting Aligning Assembling Set-over Jigs Fixtures Template Case harden Cold rolled shafting		

CHART IX. SUGGESTIONS FOR OUTLINING INDUSTRIAL COURSES.

Metal Trades Group---Sheet-metal Work.

JOBS	RELATED TECHNICAL WORK		AUXILIARY INFORMATION			
	Drafting	Mathematics	Materials Equipment	Trade Terms	Hygiene Safety	Vocational Guidance
Exercise jobs on common seams and joints Rosin Box Small rectangular nail box	Full size sketch of joints Lay-outs of all jobs	Use of rule Area and content of receptacles	Rule, square, snips, hand groover, folder, rivet set, hammer, scratch awl Solder, tin, rosin	Lay-out Scribing Lapping Soldering Copper Flux	Fire prevention Use of hand and machine tools Avoiding cuts Personal hygiene	Importance of occupation Hygiene of occupation
Drinking cups Quart measure Dust pans Buckets First aid cabinets Waste cans Small ventilator Cornice section	Lay-outs and developments of all jobs	Use of rule and dividers Areas and contents Cost of materials and labor Value of products	Machines Burring Wiring Beading Forming Grooving Letting down Shears, stakes, mandrels Tin, solder, wire, flux, galvanized iron	Burring Wiring Forming Peening Raising Flanging Setting down Guage Template Pattern	Use of furnace Use of soldering iron Use of acid Care of burns and cuts	Hours and wages Entrance to occupation Demands for labor Efficiency factors in occupation Opportunities for advancement

The Job or Unit Instruction Sheet.

Two very pertinent factors enter into the part-time program as advocated and make necessary the use of job instruction sheets. First, the composite shop plan with its diversified activities requires that the teacher employ devices to assist him in his instruction. Second, previous training and education, irregular periods of entrance to school, and the general unlikeness of needs make the instruction almost entirely individual in character. It cannot be conceived how any teacher could put through a program of educational work under the conditions demanded by this organization and have it terminate successfully without utilizing to a large degree job instruction sheets of some form.

The job instruction sheet shown in this section is made to include not only the practical job, the technical and auxiliary information but also the English, civics, American and industrial history and economics. The shop-work of the part-time school becomes the core and serves to motivate and vitalize the more academic part of the instruction. Each sheet represents a complete unit of instruction.

Job instruction sheets may be organized around complete jobs or about an operation or group of operations. It is recommended that the latter plan be used in that it will provide a very definite piece of work to be done for practically each class period. It will involve more work for the teacher and mean many more instruction sheets but will prove more satisfactory in the end.

First sheets placed in the hands of students should indicate very fully the actual procedure in doing the job. As the student advances, directions on the sheet become less detailed and present each job as a problem requiring the best efforts of the individual. Teachers should plan to check each student frequently and eliminate all guesswork procedure. In cases of students not ready to make complete use of sheets, special supplementary or drill sheets should be utilized.

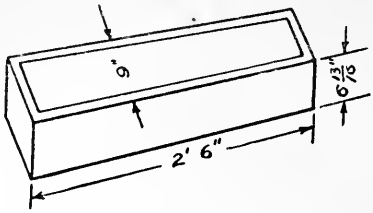
A complete discussion of the job instruction sheet or unit instruction sheet with numerous examples will be found in the monograph "Unit Instruction Sheets and Individual Instruction in Vocational Classes" by Rodgers and Furney.

. . . . . Part-time School

JOB INSTRUCTION SHEET

UNIT---BUILDING TRADES---CARPENTRY NO. 1

JOB: 1 W. P. Window Box, $6\frac{13}{16}$″ x 9″ x 2′ 6″ outside dimensions



Bill of Materials

2 Pcs. W. P. $\frac{13}{16}$″ x 6″ x 2′ 6″
1 Pc. W. P. $\frac{13}{16}$″ x 9″ x 2′ 6′
2 Pcs. W. P. $\frac{13}{16}$″ x 6″ x $7\frac{3}{8}$″

Operations

1. Select stock
2. Cut-off to rough dimensions
3. Plane working faces and edges
4. Guage to width
5. Plane to width
6. Lay-off and cut to lengths
7. Assemble sides and ends
8. Fasten on bottom
9. Bevel upper outside corners $\frac{1}{4}$″
10. Set nails, putty holes and sand-paper

Related Drafting

1. Free hand working drawing of job
2. Mechanical drawing of job, scale 3″ to 1′

Hygiene and Safety

1. Handsawing — position of hand and holding of stock to avoid personal injury

Related Mathematics

1. Figure the amount of material in one box.
2. What is the cost of material for one box at $80.00 per M?
3. What would it cost the School Board for labor and material to build 35 boxes if it takes a carpenter 40 minutes to make one and he was paid 90 cents per hour?

Trade Terms

1. What do the following terms mean: working face, working edge, butt joint, bevel?

Read: Trade Foundations, pp. 289

Tools and Materials

1. Name 5 interesting facts about white pine.

Read: Trade Foundations, pp. 194

2. Describe the proper method of using square, saw, guage, hammer.

Read: Trade Foundations, pp. 289

Vocational Guidance Information

1. Importance of carpentry
2. Conditions of employment

Read: Trade Foundations, pp. 79
Read: Occupations, pp. 163

Note: Academic subject matter is placed on reverse side of sheet.

ACADEMIC AND REQUIRED SUBJECTS

ENGLISH

1. Make up an order and prepare the form for the purchase of lumber for 35 boxes.

2. Write the definition for each of the following terms:

   Working face
   Working edge
   Butt joint
   Bevel

3. Read the story of David Maydole, Hammer Maker, in Parton's Captains of Industry.

AMERICAN HISTORY, INDUSTRIAL HISTORY, CIVICS, ECONOMICS

1. Make a list of the workers in the building trades.

   Read: Occupations, pp. 163-171; Trade Foundations, pp. 79-83

2. Make up a table showing the wages earned by apprentice and journeyman carpenters in your community.

3. Estimate or find by inquiry the number of working days in the year for carpenters in your community and then determine the annual earnings of the various classes of apprentice and journeyman carpenters.

Note: Reverse side of job instruction sheet

VIII Trade Preparatory and Extension Work in the Part-time School.

The part-time school boy should be encouraged to make an occupational decision as early as he can intelligently. This means that shops must be equipped, courses organized and teachers qualified to give intensive special trade training to some of the 15-year-old group and probably to the majority of the 16-year-old group.

Trade preparatory instruction will be an extension of industrial activities given for guidance purposes and will in most cases require additional equipment. Local conditions determine the type of prevocational work, therefore the determination of trade preparatory work in the school is no special problem. Specialized industries such as the glass, textile, and shoes, will necessitate co-operative plant extension courses.

Content of Trade Preparatory and Extension Courses.

This content should comprise material classified under the same general headings as for the prevocational work, practical jobs, technical work, and auxiliary information.

Vocational guidance information should be minimized and the emphasis placed on elementary industrial ecomonics introduced from the trade standpoint.

All teaching content should grow out of an analysis of the trade or develop from it. Each trade course should furthermore be set up as previously outlined for the elementary work. Practical jobs should be selected very carefully and should embody as many of the commercial operations on type machines as time and equipment will permit.

Equipment and Teachers.

Trade preparatory work cannot be effectively done if the equipment has been selected with only the prevocational objectives in mind. Good machines and equipment suitable for a high grade commercial plant are necessary for good instructional work.

The teacher should have had trade experience supplemented by a special preparation for teaching. This form of shop activity is distinctly trade work and as such requires an experienced trade trained man.

In placing equipment, the modern commercial shop, not the formal school, should be made the model as far as practicable.

Job or Unit Instruction Sheets.

Individual instruction or job sheets should also be used in this kind of work. The general form presented for the prevocational work is equally adapted to the trade extension course.

Whenever standardized work is going through the shops, job sheets may be prepared in advance. Irregular jobs coming in at odd times will require special work on the part of the instructor. It will be found possible to have the more advanced students take blank job sheets and fill out parts before undertaking the work.

IX. Teaching English, Mathematics, Science, Hygiene and the Social Sciences to Boys in Industrial Courses.

While the industrial courses taught in part-time schools are conceived as being of a vocational character it is evident that the usual regular school subjects are given. English, mathematics, sciences, hygiene, civics and economics find a large place in the curriculum. However, the materials and methods used in teaching such subjects are considerably different from those employed commonly in the grammar and high schools.

It is clearly recognized that "all must learn to read and to write, to use figures whenever necessary in connection with their work and in the ordinary affairs of daily life, to know enough about history to appreciate the element of growth in civilization, enough of science to understand that it means a substitution of real knowledge for mere "rule of thumb," enough of physiology and hygiene to appreciate the existence of nature's laws governing the health of the individual and of society and enough technical work to inspire an interest in the individual activities by which the majority of humanity supports itself. It is hard to conceive of attainment of genuine success in life, under present day conditions, that is not built upon at least a rudimentary working knowledge of practically all of these educational elements. These are found in the school curriculum today as a result of the working of the law of the survival of the fittest. Because they are essential they have persisted."

New methods are to be applied to the teaching of these subjects, methods based upon a sound psychology of learning—connecting up or correlating that which is to be taught with that which is of basic interest and greatest value to this group of employed boys, the industrial training.

"Learning is connecting," says Thorndike, "and man is the great learner because he forms so many connections. There are millions of them. They include connections with subtle abstract elements or aspects or constituents of things and events as well as with the concrete things and events themselves."

"Learning is connecting, and teaching is the arrangement of situations which will lead to desirable bonds and make them satisfying. A volume could well be written showing in detail just what bonds certain exercises in arithmetic, spelling, German, philosophy and the like, certain customs and laws, certain moral and religious teachings, and certain occupations and amusements, tend to form in men of given original natures; or how certain desired bonds could economically be formed."

The method of teaching the general subjects in the part-time school will be that of maintaining an intimate relation between (1) the practical industrial work and (2) those other intellectual processes which in their expressions we classify and denominate as English, mathematics, science, social sciences and hygiene. For example, the mathematics taught to a group of kiln burners in the pottery industry will include the following:

1. The telling of time—hours and minutes
2. Weighing in pounds, etc.
3. Estimating weight in pounds
4. Measuring temperatures (pyrometer, cones, expanding rings)
5. Using Fahrenheit or Centigrade scale

The science which should be taught to the same group will include the following facts:

1. C + O gives heat

(Glost kiln — heat changes powdered glaze to glass. Excessive

heat flows glaze more than necessary and cracks ware)
2. Insufficient O gives CO
3. $S+2O=SO_2$ (Correct amount of air gives CO—excess over correct amount cools kiln and wastes heat).
4. $2H+O=H_2O$
5. Free hydrogen reduces
6. Sulphur fumes reduce
7. Heat changes clay
8. Heat drives off mechanical moisture
9. More heat drives off water in crystallization
10. Clay contracts when mechanical moisture is driven off
11. Clay contracts when water is driven out of the crystals
12. Body vitrifies at proper heat
13. Body softens at too high heat
14. Body discolors if gaseous conditions is not right
15. When bisque is overfired it grows soft

The English might include oral and written expression based upon such reading as the chapter on the Pottery Industry from Elementary Industrial Arts by L. L. Winslow or The Potter's Song from Keramos by Henry Wadsworth Longfellow.

The following sections contain considerable helpful material relative to the organization and teaching of these general subjects in the part-time school.

HYGIENE

The purpose of teaching hygiene in the part-time school is to increase the occupational efficiency of the pupil. It is obvious that any improvement in the physical condition of a young worker will certainly increase his efficiency. Improper diet and infringement of the laws of physical life result in reduced energy and sickness. Children rarely have any adequate knowledge of the effect which their modes of life have upon their health and strength. Any study or training which tends to improve the pupil's health will possess real vocational value.

In the organization of instructional material care should be taken to establish the proper contacts with the types of work or the vocations which are being taught or in which the children are engaged. Some of the topics which should be included in a course of study are:

1. Occupational dangers—dangers of catching hands in knives, danger from dust, danger to eyes when working on an emery wheel, danger due to failure to use guards, etc.
2. Occupational diseases.
3. Food, clothing, rest, recreation.
   a. Food according to occupation and why
   b. Clothing according to occupation
   c. Avoidance of fatigue—"Statistics covering accidents in the factories of Illinois for a period of one year show that between the hours of 8 and 9 o'clock in the morning there were 120 accidents, and that the number steadily and progressively increased until during the hour between 11 o'clock and noon, 257 accidents were recorded. In the hour following the noon rest or between one and two o'clock there were 111, the number again increasing hour by hour until between four and five the maximum of 260 accidents was reached."

4. Physical condition in relation to the choice of an occupation.
5. State laws relative to safety and hygiene in factories
6. Hygiene in the home
7. Community hygiene

SOCIAL SCIENCES

Such subjects as American history, industrial history, civics and economics should be taught from the standpoint of social sciences. The objective should be the explanation of the industrial, economic and social situations in which the boy finds himself and some clear understanding of the development of these situations. The topics which might well be considered in such a course are as follows:

1. The modern industrial system
   a. Relationship of an employee to his employer
   b. Relationship of an employee to his fellow workers
   c. The modern factory and its advantages in a scheme of production
   d. Rewards of labor
      Opportunity to work
      Increasing earning power
      Leisure
      Satisfaction
   e. Development of modern factory system
   f. Development of modern system of free labor
   g. Necessity for management
2. Some necessary economic facts
   a. Human wants—individual, community and institutional
   b. Satisfaction of economic wants
   c. Wealth and poverty
   d. Agencies of production—land, labor, capital, management
   e. Property
   f. The economic ideal
3. Land
   a. Private ownership of land
   b. How private ownership came to be
4. Capital
   a. What capital is
   b. The capitalist
   c. Capital and labor
5. Political Science—American
   a. Constitutional rights
   b. How society governs itself
   c. Branches of government
   d. Taxes a function of government—direct, indirect, federal, state, local
   e. Federal customs
   f. Development of political institutions

MATHEMATICS

In the teaching of mathematics the teacher should organize instructional material which is intimately correlated with the jobs taught. The job

analysis should reveal just what mathematics a worker needs to know in order to perform a specified job. The gloss kiln burner in a pottery must be able to

a. weigh in pounds (platform scales)
b. measure temperature (pyrometer, cones, expansion rings)
c. use Fahrenheit and Centigrade scales
d. make a time temperature curve (Fahrenheit and Centigrade)

These various computations should be taught in connection with the jobs to which they apply or in the performance of which they are a necessary requisite.

Text books cannot be used except for drill work as it is impossible to set up in any but a specially prepared book the work which should be taught.

ENGLISH

English is generally recognized as one of the important subjects. The purposes which seem possible of realization and particularly appropriate for part-time pupils in this subject are:

1. Ability to interpret the printed page
2. Development of a genuine fondness for books
3. Development of a desire to read as a means of recreation
4. Development of the idea of the dependence of the civilized world on books
5. Development of the idea that ability to handle books will contribute to success
6. Development of power of oral and written expression
7. Development of aesthetic appreciation of literature

To induce reading it is necessary to first provide those books which the boys and girls want and which they can read easily and quickly and then to introduce the works they should have. They should have access to a large and varied assortment of books and magazines and should be encouraged to devote time to outside reading.

A general outline of English work for part-time classes follows:

1. Oral English
   a. Free discussion in all classes
   b. Talking to the point—listing points and organizing material for one minute talks
   c. Corrective drills for mispronunciations
   d. Vocabulary building
   e. Cultivation of variety of expression
   f. Correcting "and" and "then" habits
   g. Formulating intelligent questions
   h. Oral application for position
2. Reading
   a. Silent for content—how to study and to interpret orders, use of dictionary, reference works and newspapers
   b. For appreciation—exposing to library, listening to teacher give fine quotations
3. Grammar
   a. Corrective drills for misused verbs, pronouns, adjectives, adverbs, prepositions
   b. Correction of vulgarisms
   c. Punctuation of written work

d. Spelling trade terms and student's written vocabulary
e. Little work in grammar

4. Written English
   a. Copying or writing from dictation, notebook material in all classes
   b. Filling out forms
   c. Business letters
   d. Friendly letters
      Description—tools, processes, etc.
      Exposition—simple directions, etc.
      Narration—reports on shopwork, etc.

X. Suggestions on Methods of Instruction in Part-time Classes.

The analysis of the subject to be taught followed by the selection of units of instruction on the basis of the course objectives, facilities, time and abilities of students are fundamental to effective teaching. Any discussion of method must therefore consider the organization of content.

The work of the teacher may be divided into four blocks or periods:

1. The preparatory period
2. The presentation period
3. The classwork period
4. The dismissal period

The *preparatory period* is the time outside of regular class periods that teachers should give to organizing and preparing:

Instruction or job sheets
Special topics for class or group instruction
Individual assignments for students
Materials, equipment, illustrative material and supplies for class use.

One of the functions of a director or supervisor is to bring about results in terms of the above requisites.

The *presentation period* is the time in the regular school day devoted to the presentation to the class or groups of specially prepared material, either subject matter or trade practises. Two lines of approach may be utilized (1)the informational, (2) the developmental. The latter approach is the better as it provides opportunity for the largest possible amount of thinking and activity on the part of the student.

Teachers may employ four methods in connection with their instruction in individual subjects: (1) demonstration, (2) illustrative, (3) lecture, (4) experimental. An analysis of the various methods indicates that the demonstration is most effective for all-round general pruposes. The demonstration may be given in part, or in whole, by the teacher or by the students.

A director's or a supervisor's time may be well spent in part, in developing a special technique in conducting class, group or individual instruction. Problems of attention, native reactions, apperception, habit formation and self-activity should be constantly stressed.

Definiteness of purpose, summarizing and clinching of essential points in each day's work, and definite student assignments at all times, will do mush to secure results in the part-time school shops.

The *classwork period* is that part of the class period in which the students devote their time to individual assignments. Teachers during this period must render such individual assistance as will enable the students to secure the most from their assignments. Instructors of shop subjects are com-

mencing to realize that certain principles of teaching must be observed in class or group instruction but fail to carry over the same principles in connection with individual instruction. If principles are worth consideration in one case they are equally applicable in the other.

The *dismissal period* is that part of the class period given over to placing the shop in order preparatory to closing the classwork. Teachers have an opportunity here to develop standards of shop orderliness that will be very beneficial to students. This period should not be a haphazard picking up of materials, equipment etc., but a very carefully planned and organized part of the work of the class. Assigned duties to each student will usually result in the work being done rapidly and well.

Records of Student's Progress.

A student's progress record sheet should be a part of every shop teacher's equipment. Teachers should be in a position to tell at any time what jobs each student has completed and the quality of work being done. Many teachers prefer a large sheet that can be posted in the shop where students may see it daily.

This form of record may be worked out in numerous ways. The following is merely a suggestion.

STUDENTS' PROGRESS RECORD

NAMES OF STUDENTS	Jobs of the Course--Building Trades										
	Window Box	Benches	Kit Box	Window Frame	Garage			Book Shelves		Typewriter Tables	
1. Adams, Wm.	6 / C										
2. Andrews, John		9 / B									
3. Brown, Edw.	6 / B		8 / A								

FORM OF SUGGESTED PROGRESS CARD.

The minimum requirements of the course are indicated under the heading of jobs. Blank space should be left frequently to permit of the adding of special jobs. The figure in each square represents the number of hours given to the job and the letter signifies the quality of work done. Teachers will discover that students will assist in keeping this record up to date and will be very much interested in their records.

An extension of the job column will permit the teacher to add the jobs of each trade in the group and will thus give a complete record of the student's activities in the trade group.

XI. Summary.

The material that has been presented under the title, Organization and Teaching of the Industrial Subjects in a Part-time or Continuation School may be summarized as follows:

1. The occupational facts pertaining to the community are absolutely essential for the intelligent development of a program of part-time education.
2. A general survey of the occupational facts discloses that the vast majority of part-time children between the ages of 14 and 16 years are employed in juvenile occupations and will change their jobs sometime after the 16th birthday.
3. The period immediately preceding the transition of these young people from juvenile to adult occupations should be one of intelligent and sympathetic vocational guidance.
4. Vocational guidance of the greatest benefit to the individual is that guidance given through a series of controlled practical experiences, on selected jobs, drawn from a wide range of occupational activities.
5. The organization of instructional material and the equipment of shops on the trade group basis affords the greatest possible opportunity to offer selected experience in a wide variety of occupations.
6. The organization of courses or instructional content should be around the practical jobs, the related technical information and the auxiliary information which includes the vocational guidance material.
7. Instruction organized on a trade group basis means a variety of occupational activities carried on within one shop and under the direction of one teacher.
8. A variety of occupational activities for part-time students in one shop necessitates making the instruction almost entirely individual in character.
9. Individual instruction in the composite shop requires the use of job instruction sheets to supplement the work of the teacher.
10. Instruction sheets should be so organized as to specify a definite job to be done with its accompanying technical, auxiliary and academic subject matter. Sheets should in all cases be prepared in a manner to call forth the greatest amount of individual effort on the part of the student.
11. The vocational activities in the part-time school may well be the core for all the instruction offered, in this way utilizing the phase of school work that is most interesting to vitalize the entire program.
12. Trade preparatory work in the part-time school can only give at best, training in a limited number of fundamental jobs; trade extension work can offer the technical phases of the occupations that students do not secure on the job.
13. Short time contact in the part-time school requires a definite analysis and organization of teaching content; clear and well defined assignments to all students; shops and materials in readiness for work at all times; and at all times, consideration of the fundamental pedagogical principles in the individual or group instruction.

XII. SELECTED BIBLIOGRAPHY FOR THE TEACHING OF INDUSTRIAL SUBJECTS IN A PART-TIME SCHOOL

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3. Shop Mechanics and Mathematics—Johnson.
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References on Safety and Hygiene.

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4. American Machinist Magazine (Current Issues).
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2. Occupations—Gowin and Wheatley.
3. Federal Board for Vocational Education—Opportunity Monographs.
4. Vocational Guidance—Brewer.
5. Elementary Industrial Arts—Winslow.

References on Methods of Teaching.

1. The Instructor, the Man and the Job—Allen.
2. Teaching Manual Training and Industrial Arts—Griffith.